



US009557846B2

(12) **United States Patent**
Baharav et al.

(10) **Patent No.:** **US 9,557,846 B2**
(45) **Date of Patent:** **Jan. 31, 2017**

(54) **PRESSURE-SENSING TOUCH SYSTEM
UTILIZING OPTICAL AND CAPACITIVE
SYSTEMS**

(71) Applicant: **Corning Incorporated**, Corning, NY
(US)

(72) Inventors: **Izhak Baharav**, Palo Alto, CA (US);
Jeffrey Stapleton King, Menlo Park,
CA (US); **Dragan Pikula**, Horseheads,
NY (US)

(73) Assignee: **Corning Incorporated**, Corning, NY
(US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/044,030**

(22) Filed: **Oct. 2, 2013**

(65) **Prior Publication Data**

US 2014/0098058 A1 Apr. 10, 2014

Related U.S. Application Data

(60) Provisional application No. 61/744,878, filed on Oct.
4, 2012.

(51) **Int. Cl.**

G06F 3/041 (2006.01)

G06F 3/042 (2006.01)

G06F 3/044 (2006.01)

(52) **U.S. Cl.**

CPC **G06F 3/0416** (2013.01); **G06F 3/044**
(2013.01); **G06F 3/0421** (2013.01)

(58) **Field of Classification Search**

CPC G06F 3/038; G06F 3/0304; G06F 3/0383;
G06F 3/0317; G06F 3/03543; G06F

3/04883; G06F 3/03547; G06F
1/1626; G06F 3/041; G06F 3/044; G06F
3/0386; G06F 3/045; G06F
3/03545; G06F 3/0416; G06F 3/0421;
G08C 21/00

(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,333,160 A 7/1967 Gorski
3,541,541 A 11/1970 Engelbart
(Continued)

FOREIGN PATENT DOCUMENTS

EP 1059604 12/2000
EP 0901229 6/2007
(Continued)

OTHER PUBLICATIONS

Machine translation of JP2011-103094.

(Continued)

Primary Examiner — Md Saiful A Siddiqui

(74) *Attorney, Agent, or Firm* — Jason A. Barron; Joseph
E. Gortych

(57)

ABSTRACT

A hybrid touch system that utilizes a combination of a capacitive touch system for position sensing and an optical touch system for pressure sensing is disclosed. The optical touch system includes a transparent sheet having a surface, at least one light source and at least one detector which are operably arranged relative to the transparent sheet to transmit light through the sheet and to detect the transmitted light. Performing position sensing using the capacitive touch system simplifies the pressure-sensing optical touch system.

17 Claims, 23 Drawing Sheets

